MACKENZIE®

OVERHEAD PAGE MANAGEMENT

OPM-1S

Page Stacker &
Feedback Eliminator

User's Manual

Version 1.0 Revised 2/13/2004

Doc 99-20-068 - $25.00

MACKENZIE LABORATORIES, INC.
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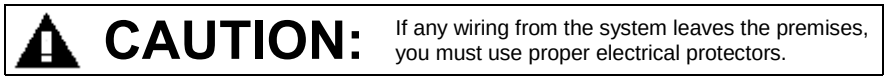
General Safety Instructions

Always follow these basic safety precautions when using the system:

1. Read carefully and understand all instructions.
2. Follow all warnings and instructions marked on the product.
3. DO NOT block or cover ventilation slots and openings.
4. DO NOT place the product in a closed enclosure or cabinet unless proper ventilation is provided.
5. Never spill liquid on the product or drop objects into the ventilation slots and openings. Doing so may result in serious damage to the components.
6. Repair or service must be performed by a factory authorized repair facility.
7. A UL/CSA approved power pack is provided.
8. DO NOT staple or otherwise attach the power supply cord to building surface.
9. DO NOT use the product near or in wet or damp places, such as wet basements.
10. DO NOT use extension cords. Install within six feet of a grounded outlet receptacle.
11. DO NOT install during lightning storm.
12. Never touch un-insulated wires or terminals unless the unit is disconnected from both power and the rest of the phone system.
13. Use Caution when installing or modifying configuration switches or control lines.
14. The unit must be securely attached to a wall board, rack or table mounted.



Regulations:

FCC (Part 15) Radio Frequency Interference

The DV-2000MTS generates and uses radio frequency energy and if not installed and used in strict accordance with the manufacturer's instructions, may cause interference to radio and television reception. Unit complies with the limits for Class A devices in accordance with the specifications in Subpart J of Part 15 of the FCC Rules. This testing is designed to provide reasonable protection against such interference. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the unit off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

-Reorient the radio or TV receiving antenna.

-Relocate the unit with respect to the radio or TV receiver or vice-versa.

-Plug the unit into a different outlet so that it and the radio or TV receiver are on different branch circuits

-If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions.

Table of Contents

Shipping Container Contents

The following items should be found in the container of OPM-1S, Page Stacker & Feedback Eliminator:

OPM-1S System
Installation and User Guide
Mounting screws
Wall mounted power pack, 12VDC @ 1 amp

Hardware Configurations

OPM-1S: 16 pages, 4 minute memory, priority input

Optional Accessories:

Standard Rack Mount Kit, Order: OPM-RM-KIT

1. OVERVIEW

1.1 Features and Capabilities

The increased sophistication of today's intercom and paging systems requires products that are easily integrated into a wide variety of applications. They must also provide increased intelligibility with better system clarity, vocal definition and reliability.

Mackenzie Laboratories, Inc. continues to respond to these requirements with our newest Overhead Page Management product, the OPM-1S. Designed for use in high traffic public address systems, the OPM-1S Page Stacker & Feedback Eliminator offers 4 minutes of audio storage with excellent audio clarity. Page stacking and record while play are key features of the OPM-1S design. The unit is able to stack and play up to 16 pages while recording new pages at the same time.

Additionally, the OPM-1S makes feedback through the paging system virtually impossible by opening the loop between the input microphone and speakers. This eliminates the potential for acoustic feedback while giving the user flexibility in the manner which pages are broadcast. Multiple operational modes, Dry or Loop Start, Page Repeat, Delay, Pre-Page Tone and Priority bypass features allow the OPM-1S to be tailored to many paging applications.

1.2 General Specifications

Audio Quality:

Performance:	16 bit, mono
Dynamic Range:	60dB
Frequency Resp.:	100 Hz to 6.8 kHz
THD:	<1%
Signal to Noise:	60dB

Audio Connections:

Page Input:	RJ12, 600ohm, transformer isolated
Priority Input:	RJ12, 600ohm, transformer isolated
Line/Power Output:	RJ12, adjustable, transformer isolated +4dB/600ohm OR 500mW/8ohm

Audio Memory:

Type:	Non-volatile FLASH
Storage Time:	4 minutes
Pages:	16

Status:

LED(s):	Power, Loop Start Current(Priority & Audio Input), Audio Sense, Busy, Play, Record

Control I/O:

Control Inputs:	Record, Play, Stop, Priority, Abort
Relay Outputs:	Record, Play, In Use
Interface:	12 position Euro-style terminal strip

Power:

Input Voltage:	12VDC
Current:	1 amp
Connection:	2.5mm barrel, center positive
Fuse:	Internal, self reset

Mechanical:

Wall mountable chassis, rack mount option
10" wide x 6.75" deep x 1.5" high, 2.6 lbs.
18 gauge cold rolled steel chassis
Texture coated paint process

Regulatory Agency Approvals:

FCC, Part 15, Class A
UL/CSA approval on external wall mounted power pack

2. INSTALLATION & CONFIGURATION

This section provides complete instructions for mounting the OPM-1S Page Stacker & Feedback Eliminator on a wall, rack or table. It also illustrates all interface requirements to auxiliary equipment, including inputs and outputs. Configuration switch settings are provided.

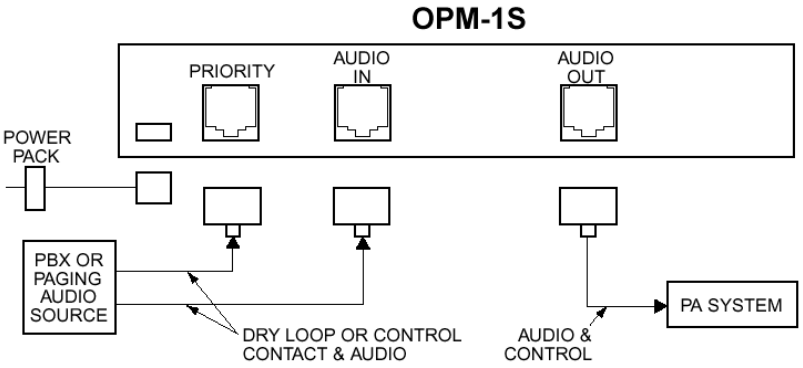
2.1 Installation Steps

These are the general steps for installation:

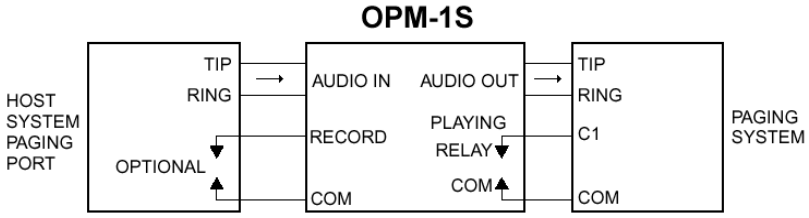
1. Find a space on the wall, rack or table. Mount the unit to the selected place with it's wiring at least 18" away from the power supply or other equipment that generate electrical noise. Secure unit using the supplied mounting screws.
2. Make sure there is a standard electrical outlet into which you can plug the power pack. This outlet should NOT be controlled by a switch.
3. Make cable connections from the OPM-1S to the PBX or audio source and the Paging system,
4. Set DIP switches to the desired operation.
5. Connect the power supply. Power Led should illuminate GREEN.
6. Test unit operation.

2.2 Example of System Setup

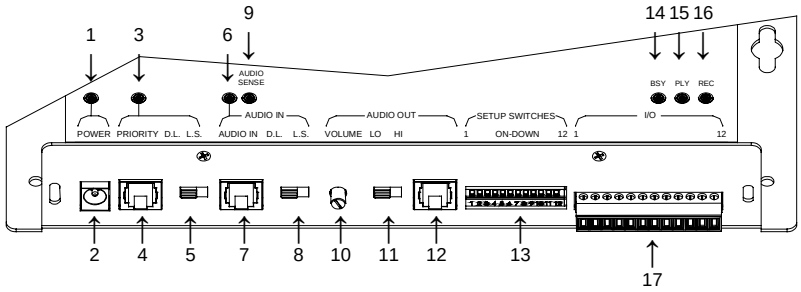
The Page Stacker & Feedback Eliminator Model OPM-1S can be configured in several ways depending on the paging system used. The following illustration shows a typical installation.



The OPM-1S is typically installed between the telephone system, or paging microphone console and the paging system amplifier(s), as shown. It interfaces with the paging controller in a zone paging environment, and with the amplifier in a single-zone installation.



2.3 Hardware Description



1. Power LED
2. Power Input
3. Priority Input LED
4. Priority, Audio/Control Connector
5. Priority Mode Switch
6. Audio Input LED
7. Audio In, Audio/Control Connector
8. Audio In Mode Switch
9. Audio Sense LED
10. Volume, Audio Out Control
11. Lo/Hi, Audio Out Selector Switch
12. Audio Output, Audio/Control Connector
13. Setup Switches, for selection of optional operational functions
14. Busy LED
15. Playing LED
16. Recording LED
17. General Purpose I/O Connector

2.3.1 Status LED Indicators

Power LED - Green, indicates unit is ON.
Priority Input LED - Yellow, Indicates loop start current flow.
Audio Input LED - Yellow, Indicates loop start current flow.
Audio Sense LED - Green, indicates audio signal is present on Audio Input.
Busy LED - Yellow, indicates the system is busy recording, playing, delaying a message or making a priority announcement.
Playing LED - Green, indicates OPM-1S is playing a page.
Recording LED - Red, indicates OPM-1S is recording a page.

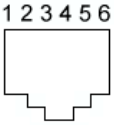
2.3.2 Power Input

Unit requires 12 VDC @ 1amp, connect power pack supplied. Chassis is connected to negative side of power supply.

2.3.3 Priority Audio/Control Connector

Input RJ12 style connector, 6 position

1. Not used.
2. PRIORITY input, connect to Ground (Pin 5) to activate.
3. PRIORITY Audio, ring.
4. PRIORITY Audio, tip.
5. Ground. (power return). Connected to chassis.
6. Not used.



2.3.4 Priority Mode Switch

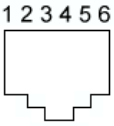
DRY LOOP - LEFT Position. Configures priority audio input for 600ohm, line level(-10dB nominal).

LOOP START - RIGHT Position. Configures priority audio input for 900ohm and supplies 24VDC talk battery. Compatible with loop start trunk ports.

2.3.5 Audio In, Input/Control Connector

Input, RJ12 style connector, 6 position.

1. Not used.
2. Record input, connect to Ground (Pin 5) to activate.
3. Audio, ring
4. Audio, tip.
5. Ground, (power return). Connected to chassis.
6. Not used.



2.3.6 Audio Input Mode Switch

DRY LOOP - LEFT Position. Configures audio input for 600ohm, line level(-10dB nominal).

LOOP START - RIGHT Position. Configures priority audio input for 900ohm and supplies 24VDC talk battery. Compatible with loop start trunk ports.

2.3.7 Volume

Controls the audio output volume level delivered to the paging system. It is shipped with 1:1 gain factory set.

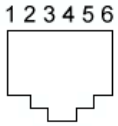
2.3.8 Audio LO/HI Switch

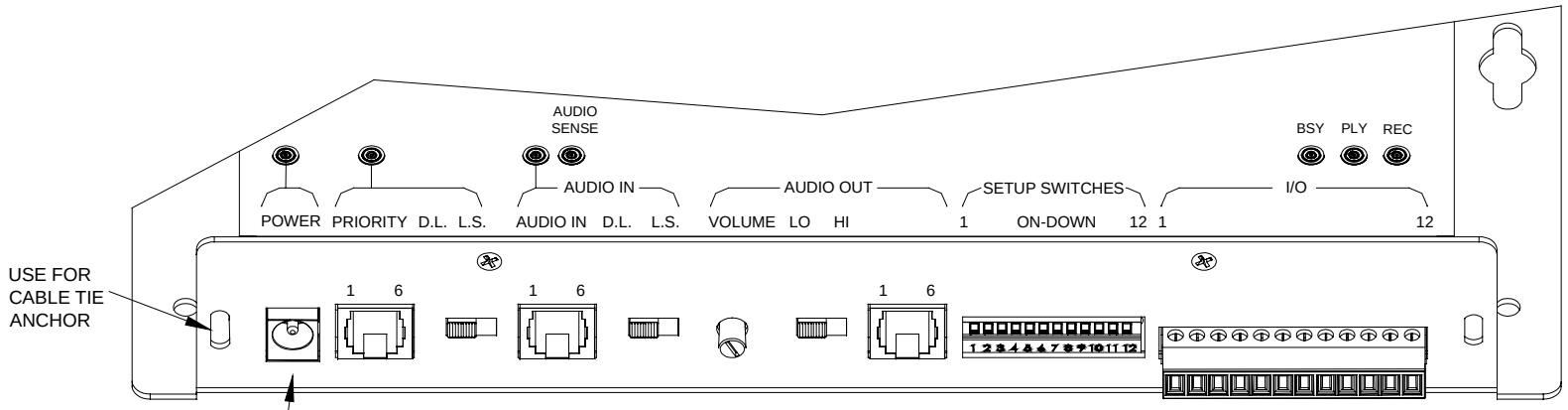
This will select the type of audio drive available at the AUDIO/STATUS connector. LEFT for power level (500mW/8ohm), and RIGHT for line level (+4dB/600ohm).

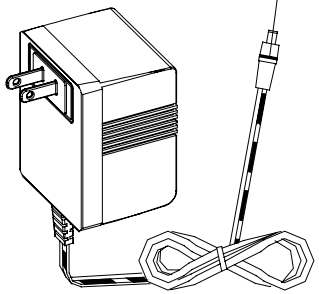
2.3.9 Audio Output, Audio/Control Connector

Output, RJ12 style connector, 6 position.

1. Not used.
2. Playing contact, common.
3. Audio Output (-).
4. Audio Output (+)
5. Playing contact, Normally Open (Factory set). Refer to manual for Normally Closed option.
6. Not used.







12 VDC @ 1A

PRIORITY

DRY LOOP
LOOP START

1. Not used
2. PRIORITY, Input
3. PRIORITY, ring
4. PRIORITY, tip
5. Ground, (Power Return)
6. Not used

AUDIO in

DRY LOOP
LOOP START

1. Not used
2. RECORD, Input
3. Audio, ring
4. Audio, tip
5. Ground, (Power Return)
6. Not used

AUDIO OUT

8 Ohm Power level
600 Ohm Line level

1. Not used
2. Playing contact, common
3. Audio Output (-)
4. Audio Output (+)
5. Playing contact, Normally Open (Factory Set)
6. Not used

SETUP SWITCHES

OFF ON * = Default Setting

1 2 RECORD Activation
- * Off Hook (loop current)
- Audio Sensor
- DTMF
- Not in Use

3 DTMF Tone Stripping
- * Active
- Not - active

4 DTMF Stripping Method
- * Strip only tones at start of a recorded page.
- Strip any tones in messages, and restart recording message.

5 6 DTMF Allotment
- * Unlimited
- 4 tones
- 3 tones
- 2 tones

7 "#,#" Abort Enable
- * Active
- Inhibit

8 Play Mode
- * Automatic
- Manual

9 Pre-Page Tone
- * Not Active
- Active

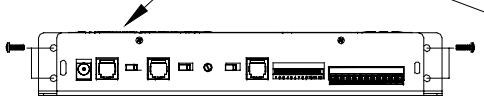
10 Number of Plays
- * Play message one time
- Play message two times.

11 12 Delays Between Plays
- * 1 second (Minimum)
- 3 seconds
- 5 seconds
- 10 seconds

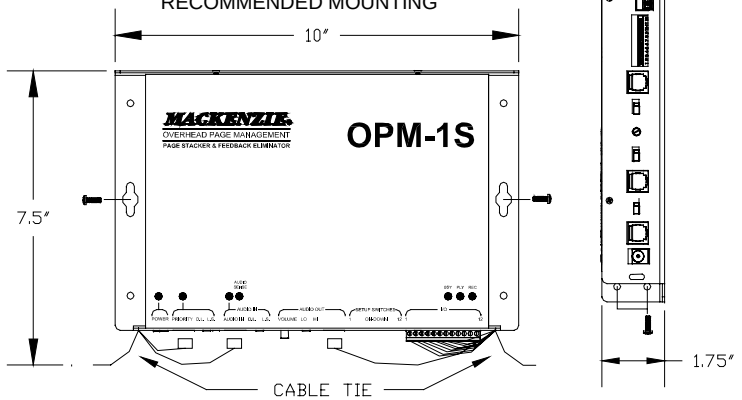
I/O CONNECTIONS

1. COMMON to all control functions.
2. ABORT input.
3. PRIORITY input, Paralleled on PRIORITY RJ12
4. STOP input.
5. PLAY input.
6. RECORD input, Paralleled on AUDIO IN RJ12
7. IN USE contact, N/O
8. IN USE contact, Common
9. PLAYING contact, N/O
10. PLAYING contact, Common
11. RECORDING contact N/O
12. RECORDING contact, Common

OPTIONAL MOUNTING



RECOMMENDED MOUNTING



OPM-1S Quikey
V1.0 2/20/2004
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2.3.10 Setup Switches

12 position DIP Switch: UP position is OFF, DOWN position is ON. * indicates factory Default Setting. Settings are scanned on power up. Power must be cycled for changes to take effect.

Record Activation Method
The method with which the user will enter the record mode.

1	2	
▮	▮	*Off Hook(Loop Current) - The OPM-1S will source "talk battery" onto the ring and tip lines. The system will sense loop current flow to start the recording process for the duration of the loop current flow. Audio Input Mode Switch should be set for Loop Start.
▮	▯	Audio Sensor - The OPM-1S will start recording when the audio sensor goes active and will stop when the audio sensor is inactive for 3 seconds. Audio Input Mode Switch should be set for Dry Loop.
▯	▮	DTMF - The OPM-1S will start recording when it detects a valid DTMF tone and will stop when the audio sensor is inactive for 3 seconds. Audio Input Mode Switch should be set for Dry Loop.
▯	▯	Not in use

NOTE: Record/Priority Input activation(see Audio In, Priority Audio/Control or General Purpose I/O Connectors) is always available regardless of switch settings. A maintained contact closure on any of these inputs will start the recording process for the duration of the closure.

DTMF Tone Stripping
DTMF tones recorded at the beginning of an audio message are typically used for zone control purposes. A repeated page should not have the zone control tones on the front end of the second page because the zone controller is already routed, therefore these tones will be stripped on the repeat of a page. DTMF tones at the beginning of the page would be handled in this fashion. Any DTMF tones recorded in the middle of the message would be recorded and played back in the typical manner.

3	
▮	*Active
▯	Not Active

DTMF Tone Stripping Method

This setting determines how and where the DTMF tones coming from audio input, during a recording, are processed. Tones can be stripped only at the beginning of the message or at the middle of the message. If the tones recorded page are stripped in the middle of the message all recorded information preceding those tones will be deleted, resetting the message start.

4

- *Strip only tones at the start of a recorded page.
- Strip any tones in message and restart recording message.

DTMF Allotment

Most paging systems require a limited number of tones to be recorded because of zone controlling equipment. If the selected number of tones is exceeded the OPM-1S will abort that particular recording.

5	6	
		*Unlimited number of DTMF tones
		4 tones
		3 tones
		2 tones

 # # Abort

This would allow a caller to abort a page being recorded by pressing the "#" button two times within one second. The recording will immediately be aborted and the busy back tone sent to the input. A single "#" sign during the recording will not have any effect.

7

- *Enable
- Disable

Play Mode

Allows for automatic playback of page after recording.

8

- *Auto Play
- Manual

Pre-page Tone

A pre-recorded tone can be output prior to message playback. This is used to alert listeners that a message is about to be played. This tone will be output before each message in the playback queue but not before the repeated plays.

9

- *Disable
- Enable

Number of Plays

The number of times which each message plays during the playback sequence. If multiple messages were recorded into the queue, each message will play this number.

10

- * Play once
- Play twice

Delay Between Plays

To make the page sequence more intelligible, a pause can be inserted between each message in the playback sequence as well as between any repeats of each message.

2.3.11 General Purpose I/O Connector:

12 position Euro-style, two piece, pluggable type. 

1. COMMON to all control functions.
2. ABORT input - Cancels any activity of the OPM-1S.
3. PRIORITY input - Activation signal for Priority. Paralleled on Priority Audio/Control Connector, position 2.
4. STOP input - Stops current record or playback operation of the OPM-1S.
5. PLAY input - Manual playback activation signal.
6. RECORD input - Record activation signal for Audio In. Paralleled on Audio In Input/Control Connector, position 2.
7. IN USE contact - Relay indicating the system is busy.
8. IN USE contact - Common
9. PLAYING contact - Relay indicating the system is playing.
10. PLAYING contact - Common
11. RECORDING contact - Relay indicating the system is recording.
12. RECORDING contact, Common

3. OPERATION

There are three important functions that the OPM-1S performs:

1. It eliminates feedback by recording the incoming page(s), then playing it back.
2. It is able to repeat each page allowing for better intelligibility in a noisy environment.
3. It is capable of stacking up to 16 incoming pages by Record incoming pages while Playing back previously recorded ones on a first-in first-out basis.

Other important features include the ability to Record/Regenerate, or Block DTMF tones for use in zone controller applications.

The OPM-1S is designed to run in both Automatic and Manual modes. For paging applications the Automatic mode is the most widely used. This mode requires minimum installation time since it is the factory's default setup. RJ12 connectors are used for Audio inputs and outputs. Where logical, certain control signals are also provided on the individual RJ12 connectors associated with each input.

3.1 Page Recording

Upon receiving a valid recording signal, the OPM-1S will start recording at the beginning of the memory until the page is complete. While this page is playing, if a new page is requested it will be recorded. Multiple pages will be recorded in series until the playing message has completed it's play routine. If, for any reason, the end of available recording memory is reached, the system will immediately stop recording, and a Busy back tone will be sent back through the audio source signaling the user that the OPM-1S is not available. Any message prematurely cut off because the end of memory was reached will not be played. If the memory is filled and a new recording command is offered, the OPM-1S will not go into record mode and a busy back tone will be output to tell the user that the OPM-1S is not available.

3.2 Automatic Record Activation Methods

There are several methods to initiate automatic record mode on the OPM-1S. The activation mode will be selected by the Setup Switches upon power up. It cannot be changed during normal operation.

Loop Start, 2 Wire - The OPM-1S will source the talk battery(24VDC) to the ring and tip, sense the loop current when phone goes off hook and start the recording process for the duration of the page. For this mode, the following settings and configurations apply:

- Record Activation Method set to Off Hook(1=OFF,2=OFF) on the setup switches.
- Loop start trunk port or compatible 900ohm input with Audio ring on pin 3 and Audio tip on pin 4 of the Audio In connector.
- Audio Input Mode Switch set to Loop Start.

Audio Activation - For record activation without a separate switch closure. The OPM-1S will start recording when the audio sensor goes active and will stop when the audio sensor is inactive for three seconds. For this mode, the following settings and configurations apply:

- Record Activation Method set to Audio Sensor(1=OFF,2=ON) on the setup switches.
- Source audio on pins 3 and 4 of the Audio In connector.

DTMF Activation - For record activation without a separate switch closure and perhaps noisy audio lines. The OPM-1S will start recording when it "sees" a valid DTMF tone and will stop when the audio sensor is inactive for three seconds. For this mode, the following settings and configurations apply:

- Record Activation Method set to DTMF(1=ON,2=OFF) on the setup switches.
- Source audio on pins 3 and 4 of the Audio In connector.

3.3 Automatic Playback

The OPM-1S can be configured to automatically playback pages after their record process has completed. This mode is configured by setting Setup Switch 8 to OFF.

3.4 Manual Record Activation

Dry Loop, 4 Wire(contact activation mode) - A separate switch closure provided to the OPM-1S record input will put the unit into the Record mode for the duration of the contact closure. This mode is available regardless of any other mode selection. For this mode, the following settings and configurations apply:

- Source audio on pins 3 and 4 of the Audio In connector.
- Record switch connected to pins 2 and 5 of the audio connector OR pins 1 and 6 of the General Purpose I/O connector

3.5 Manual Playback

The OPM-1S may be configured for manual or switch closure playback when you want full control of when pages will playback. Playback is triggered via a momentary closure. For this mode, the following settings and configurations apply:

- Play Mode set to Manual(8=ON) on the setup switches.
- Audio output device(speaker,amplifier,zone contoller) connected to pins 3 and 4 of the Audio Out connector.
- Playback switch connected to pins 1 and 5 of the General Purpose I/O connector.

3.6 Priority Activation

The OPM-1S offers a Priority input to gain immediate access to the public address system. Activation of priority halts the playback of recorded pages. When the priority page is completed, the OPM-1S will resume playback from the beginning of the message that was interrupted. Priority Activation methods include Loop Start, 2 Wire and Dry Loop, 4 Wire. Descriptions of these methods are contained in the Automatic and Manual Record Activation sections and applied to the Priority Audio Connector and Priority Mode Switch.

4. Constraints

-The OPM-1S can store up to 16 pages.
-Each page is allowed a maximum of 1 minute recording time. Pages exceeding this will be aborted and a busy back tone is generated.
-Recordings that reach the end of memory are considered incomplete. These pages are aborted and a busy back tone is generated.
-The recorded message must be a minimum of one second in length. Any message shorter than this will be aborted.
-The OPM-1S aborts pages that are comprised of 3 or more seconds of silence. The page is deleted and a busy back tone is generated.

5. WARRANTY, SERVICE & RETURNS

The industrial grade housing and quality construction of the Mackenzie OPM-1S virtually eliminates the need for service or maintenance. There are no user-serviceable components within the Mackenzie OPM-1S. Refer all servicing to the factory.

5.1 Warranty Coverage:

The Mackenzie OPM-1S is tested and checked before shipment and is guaranteed against defective material or workmanship for a period of one (1) year from the date of purchase. Should trouble ever develop, contact the Factory directly by telephone or in writing. If it is determined that the equipment requires Factory service, return it to the Factory. If our inspection shows that the trouble was caused by defective material or workmanship, we will repair or replace the equipment without charge and return prepaid. Repairs made necessary by abuse, improper use, unauthorized service or maintenance, and/or improper installation, as well as out of warranty repairs, will be charged at our regular repair prices
in effect at the time. The obligation under this warranty shall be limited to the replacement, repair or refund of any such defective device within the warranty period, at Mackenzie's discretion.

This warranty is in lieu of and excludes all other warranties, expressed or implied, and in no event shall MACKENZIE be responsible for damage to other equipment or property, for any anticipated profits, consequential damages, loss of item, or other operation or use of this product, and MACKENZIE'S maximum liability shall not ever be greater than the price paid for the equipment. This warranty gives you specific legal rights. Your rights may vary from state to state. Inquiries regarding use, repair and service should be made to:

MACKENZIE LABORATORIES, INC.
1163 Nicole Court, Glendora, CA 91740 USA
Telephone: (909) 394-9007 / FAX No: (909) 394-9411

5.2 What we ask you to do:

To get warranty service for your OPM-1S system, you must provide proof of the date of original purchase. In the event you need to ship your OPM-1S system to the factory for service, call us for a return authorization number. When you ship your OPM-1S system, you must prepay all shipping cost. We suggest that you retain your original packing material in the event that you need to ship your OPM-1S system. When sending your OPM-1S system to the factory, include your name, address, phone number, proof of date of purchase, and a description of the operating problem. After repairing or replacing your OPM-1S system, we will ship it to your return address at no cost to you within the USA. Repair or replacement of your OPM-1S system at our factory is your exclusive remedy.

5.3 What this warranty does not cover:

This warranty does not cover defects resulting from accidents, damage while in transit to factory, alterations, unauthorized repairs, failure to follow instructions, misuse, fire, flood and acts of God.

Warranty & Registration Card for the
OPM-1S - Page Stacker & Feedback Eliminator

Date:_____ Serial No.: _____

Purchaser: _____

Address: _____

City: _____ State: _____ Zip: _____

Phone: _____ Fax: _____ Email: _____

Seller: _____

Address:_____

City: _____ State: _____ Zip: _____

Phone: _____ Fax: _____ Email: _____

Return warranty card via:

FAX: (909) 394-9411
MAIL: Address on reverse side
ONLINE: www.macklabs.com/registration.html

NOTES

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Return Address

MACKENZIE LABORATORIES, INC.
1163 Nicole Court
Glendora, CA 91740 USA

OTHER MACKENZIE PRODUCT LINES

Storecasting & Message On Hold - Mackenzie's full line of digital Storecasting & Message-On-Hold systems, turn your public address system and telephone into a powerful marketing tool. The DYNAVOX series offers maintenance free digital playback with tape, modem or satellite download. Several varieties are available with advanced features such as Music-Thru, individual message enable/disable, message sequencing and more.

Digital Message Repeaters - Mackenzie's line of Digital Message repeaters are the ideal audio announcement solutions for Public Address, Amusement, Entertainment, Museum and Exhibit applications. Self contained solid state systems offer unparalleled reliability. A variety of channel, connection, bandwidth and memory configurations are available.

Controls and Peripherals - Many applications require additional equipment to optimize the performance of Mackenzie products. This area focuses on items developed or sourced for their compatibility, ease of use and value. Included are, input/output controllers, speakers, amplifiers, motion sensors and pushbuttons among others.

Transit - Mackenzie is making a difference in transit applications with innovative solutions for ADA compliance and Passenger Information Systems. These products address a variety of audio and text messaging requirements and support both in-vehicle and wayside installations.